

**SMART RECEIPT****BACKGROUND OF THE INVENTION**5    **1.    Technical Field:**

The present invention relates generally to computer network environments, and more specifically to the maintenance of receipt information regarding commercial transactions.

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**2.    Description of Related Art:**

Many merchants now employ Electronic Bill Presentment and Payment (EBPP) which send invoices to customers over the Internet. Customers may then pay  
15 bills electronically via Web payment services in which they are enrolled. EBPP thus provides the customer with a personal account of bills payable. EBPP services may also provide links to information and support services that are not available with paper invoices. However, no  
20 equivalent service is provided for customer receipts.

Current business processes for Point of Sale (POS) generate a "hard-copy receipt" or "electronic receipt" for the customer for every purchase. This POS process also keeps receipts for the customers, merchants, and  
25 credit card companies (assuming the purchase was made with a credit card). Thus, the same receipt information is kept in multiple locations. However, this information is static and cannot be enhanced if additional information is necessary. In addition, customers have no  
30 control over the disposition of the receipt or the

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dissemination of the receipt information to third parties  
Current approaches also do not provide personal receipt  
accounts which customers may access.

Therefore, it would be desirable to have an  
5 electronic receipt service that enables customers to  
retrieve their electronic receipts and control the  
disposition of those receipts.

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**SUMMARY OF THE INVENTION**

5 The present invention provides a method, program,  
and system for processing electronic receipts within a  
computer network. The present invention comprises  
creating a customer profile for a user using a Smart  
Receipt application. When the user purchases items,  
electronic receipts (smart receipts) are sent from the  
point of sale to a designated database. The database may  
10 be on a credit card company server, the product  
manufacturer's server, a special cash receipts server, or  
a central clearing house server. When the customer wants  
a copy of a receipt, he or she enters search parameters  
which specify the desired receipt. The search parameters  
15 may include item type, date of purchase, and method of  
purchase. A Smart Receipt object is then initiated,  
which retrieves the specified smart receipt from the  
appropriate database, according to the search parameters.  
A copy of the retrieved smart receipt is then downloaded  
20 to a client machine (e.g. PDA, PC) designated by the  
customer profile.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

10       **Figure 1** depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented;

15       **Figure 2** depicts a block diagram of a data processing system that may be implemented as a server in accordance with a preferred embodiment of the present invention;

**Figure 3** depicts a block diagram illustrating a data processing system **client** in which the present invention may be implemented;

20       **Figure 4A** depicts a diagram of a client in the form of a personal digital assistant (PDA) in accordance with a preferred embodiment of the present invention;

**Figure 4B** depicts a block diagram illustrating the hardware configuration of a PDA in accordance with a preferred embodiment of the present invention;

25       **Figure 5** depicts a schematic diagram illustrating the architecture of the Smart Receipt service in accordance with the present invention;

30       **Figure 6** depicts a schematic diagram illustrating a Smart Receipt clearing house service in accordance with the present invention; and

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**Figure 7** depicts a flowchart illustrating the process of configuring a user profile for the Smart Receipt service in accordance with the present invention;

**Figure 8** depicts a flowchart illustrating the Smart Receipt purchasing process in accordance with the present invention; and

**Figure 9** depicts a flowchart illustrating the Smart Receipt search process in accordance with the present invention.

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**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

The present invention provides a process for  
5 handling electronic receipts in order to avoid  
duplication of information, and also provides services  
for the customer in need of additional information about  
a purchased item.

With reference now to the figures, **Figure 1** depicts a  
10 pictorial representation of a network of data processing  
systems in which the present invention may be implemented.  
Network data processing system **100** is a network of  
computers in which the present invention may be  
implemented. Network data processing system **100** contains  
15 a network **102**, which is the medium used to provide  
communications links between various devices and computers  
connected together within network data processing system  
**100**. Network **102** may include connections, such as wire,  
wireless communication links, or fiber optic cables.

20 In the depicted example, a server **104** is connected to  
network **102** along with storage unit **106**. In addition,  
clients **108**, **110**, and **112** also are connected to network  
**102**. These clients **108**, **110**, and **112** may be, for example,  
personal computers or network computers. In the depicted  
25 example, server **104** provides data, such as boot files,  
operating system images, and applications to clients  
**108-112**. Clients **108**, **110**, and **112** are clients to server  
**104**. Network data processing system **100** also includes PDA  
**120** and may include additional servers, clients, and other  
30 devices not shown.

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In the depicted example, network data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1** is intended as an example, and not as an architectural limitation for the present invention.

Referring to **Figure 2**, a block diagram of a data processing system that may be implemented as a server, such as server **104** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention.

Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI

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local bus **216**. A number of modems may be connected to PCI bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors.

Communications links to network computers **108-112** in

- 5 **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

- Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from  
10 which additional modems or network adapters may be supported. In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either  
15 directly or indirectly.

- Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in  
20 place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention. Standard components such as a keyboard, mouse and display are not shown in this figure.

- The data processing system depicted in **Figure 2** may  
25 be, for example, an eServer pSeries system, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) or Linux operating systems.

- With reference now to **Figure 3**, a block diagram  
30 illustrating a data processing system is depicted in which the present invention may be implemented. Data processing

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system **300** is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, local area network (LAN) adapter **310**, audio adapter **316**, graphics adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, CD-ROM drive **330**, and DVD drive **332**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as Windows 2000, which is available from

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Microsoft Corporation. An object oriented programming system such as Java may run in conjunction with the operating system and provide calls to the operating system from Java programs or applications executing on data processing system **300**. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented programming system, and applications or programs are located on storage devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

As another example, data processing system **300** may be a stand-alone system configured to be bootable without relying on some type of network communication interface, whether or not data processing system **300** comprises some type of network communication interface. As a further example, data processing system **300** may be a Personal Digital Assistant (PDA) device, which is configured with ROM and/or flash ROM in order to provide non-volatile memory for storing operating system files and/or user-generated data.

The depicted example in **Figure 3** and above-described examples are not meant to imply architectural limitations. For example, data processing system **300**

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also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

With reference now to **Figure 4A**, a diagram of a client in the form of a personal digital assistant (PDA) is depicted in accordance with a preferred embodiment of the present invention. PDA **400** includes a display **402** for presenting textual and graphical information. Display **402** may be a known display device, such as a liquid crystal display (LCD) device. The display may be used to present a map or directions, calendar information, a telephone directory, or an electronic mail message. In these examples, screen **402** may receive user input using an input device such as, for example, stylus **410**.

PDA **400** may also include keypad **404**, speaker **406**, and antenna **408**. Keypad **404** may be used to receive user input in addition to using screen **402**. Speaker **406** provides a mechanism for audio output, such as presentation of an audio file. Antenna **408** provides a mechanism used in establishing a wireless communications link between PDA **400** and a network, such as network **400** in **Figure 1**.

PDA **400** also preferably includes a graphical user interface that may be implemented by means of systems software residing in computer readable media in operation within PDA **400**.

Turning now to **Figure 4B**, a block diagram illustrating the hardware configuration of PDA **400** is shown in accordance with a preferred embodiment of the present invention. PDA **400** is an example of a PDA in

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which code or instructions implementing the processes of the present invention may be located. PDA 400 includes a bus 422 to which processor 424 and main memory 426 are connected. Display adapter 428, keypad adapter 430, storage 432, and audio adapter 434 also are connected to bus 422. Modem 436 provides a mechanism for PDA 400 to communicate with a computer network, such as Network 100. Cradle link 438 provides a mechanism to connect PDA 400 to a cradle used in synchronizing data in PDA 400 with another data processing system. Further, display adapter 428 also includes a mechanism to receive user input from a stylus when a touch screen display is employed.

An operating system runs on processor 424 and is used to coordinate and provide control of various components within PDA 400 in Figure 4B. The operating system may be, for example, a commercially available operating system such as Palm OS, which is available from Palm Corporation. Instructions for the operating system and applications or programs are located on storage devices, such as storage 432, and may be loaded into main memory 426 for execution by processor 424.

Those of ordinary skill in the art will appreciate that the hardware in Figure 4B may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash ROM (or equivalent nonvolatile memory) or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in Figure 4B.

Referring to Figure 5, a schematic diagram illustrating the architecture of the Smart Receipt service is depicted in accordance with the present

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invention. The present invention creates a "Smart Receipt" object **505** resident on the customer's personal computer or PDA. This Smart Receipt object manages access to all of the user's receipts, and eliminates the need to create a "customer copy" of receipts. When a customer makes a purchase, smart receipts (along with user identification data) are sent from the Point of Sale (POS) **501** to various destinations, depending on the method of payment. For example, smart receipts for credit card purchases might be sent to the credit card company server **502** and/or manufacturer server **503**. Smart receipts for cash or check purchases can be sent to a cash receipt server **504** or the manufacturer server **503**. The cash receipt server may be maintained by a merchant or bank, or used as a safe deposit for the customer.

Maintaining the receipts on the manufacturer and cash receipts servers **503** and **504**, facilitates customer service. By using the smart receipts, manufacturers and merchants can maintain and update customer databases much more efficiently than relying on warranty cards or proof of purchase certificates mailed in by customers after a purchase. The database of smart receipts, combined with customer identification data stored with the receipts, allows merchants and manufacturers to offer additional services, such as extended warranties, product upgrades, product recalls, as well as other services related to product safety and quality control. Thus, the Smart Receipt service might make a merchant, credit card company, or manufacturer more attractive to customers.

By using the Smart Receipt service, a customer can make purchases without having to worry about keeping or storing receipts. At the time of purchase, the user

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would have the option of providing a number/code for categorizing the purchase. For example, the purchase might be for personal, business or educational purposes. When the customer needs the receipt at a later date, the

5 customer uses the Smart Receipt object **505** to obtain the receipt from the appropriate location. For example, if the customer is experiencing problems with a refrigerator that was purchased six months earlier, the customer would use the Smart Receipt object **505** to obtain the smart

10 receipt by entering search criteria such as: item type, brand name, approximate date of purchase, method of purchase (i.e. cash or credit), and a price range. The Smart Receipt object **505** uses this search criteria and the customer's identity, to access the customer's credit

15 card and cash purchase records, which are stored at the appropriate location. After the Smart Receipt object **505** obtains the desired smart receipt, it can make additional requests on behalf of the customer. Continuing the above example, the Smart Receipt object **505** might contact the

20 refrigerator manufacturer to obtain information about the warranty on the refrigerator. This may be accomplished by contacting a manufacturer web site or server. As another example, the Smart Receipt can also be configured to obtain receipts which may be used for tax deduction

25 purposes.

The smart receipts are encrypted and cannot be modified by the customer/user, thus ensuring their authenticity for such purposes as proof of purchase and tax deductions. However, it should be emphasized that

30 the receipts are owned by the customer, not the merchants, manufacturers, or credit card companies. Therefore, the customer controls where the receipts are

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stored and when they can be accessed. With conventional receipts, merchants or credit card companies may give the receipt information to third parties which may use the information for mailing lists or other marketing uses.

5 Though customers can request that their receipt information not be sent to third parties, this is an extra step that customers must take, and often do not. By contrast, with the present invention, the customer owns the smart receipts and controls how and if the  
10 receipt information is disseminated. Therefore, the present invention provides security and privacy that conventional sales receipts do not. Moreover, the customer can set the Smart Receipt object to  
15 card companies not send the receipt information to third parties.

Referring to **Figure 6**, a schematic diagram illustrating a Smart Receipt clearing house service is depicted in accordance with the present invention. The  
20 architecture illustrated in **Figure 6** is equivalent to that of **Figure 5**. However, **Figure 6** also includes a central receipt clearing house **606**. The clearing house **606** provides a central location for filing smart receipts from POS **601** and retrieving the receipts via Smart  
25 Receipt object **605**.

The architecture in **Figure 5** requires the POS **501** and Smart Receipt object **505** to directly contact each separate receipt repository **502**, **503**, and **504**. By contrast, the **Figure 6** architecture allows all receipt  
30 storage and retrieval to occur at a central location, clearing house **606**, thus simplifying communications and record keeping.

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The clearing house architecture also provides the customer with an extra degree of control and privacy. As stated above in reference to **Figure 5**, the customer owns the smart receipts and may set the Smart Receipt object to automatically request that receipt information not be sent to third parties. In addition, if the customer does not want the smart receipts to be stored by the merchants or credit card companies at all, the customer can request that the receipts be sent from the POS to a clearing house account. In this way the merchant, manufacturer, bank, or credit card company is not authorized to place the receipt in its own database. Instead, the customer maintains complete control. The request to send smart receipts to a clearing house may be entered by the customer during a purchase or may be preset as a preference in the Smart Receipt object, which would automatically send the request every time a purchase is made.

Referring to **Figure 7**, a flowchart illustrating the process of configuring a user profile for the Smart Receipt service is depicted in accordance with the present invention. The customer begins by starting the registration process on the Smart Receipt service web site (step **701**). The customer downloads a Smart Receipt application (step **702**) and configures his or her user profile and preferences (step **703**). The customer profile contains personal identification information such as name and password. In addition, credit card numbers, purchase classifications (e.g. business, personal, educational), information related to tax deductions, and other personal/financial information might be included in the customer profile. The customer profile might also



Referring now to **Figure 8**, a flowchart illustrating the Smart Receipt purchasing process is depicted in accordance with the present invention. When using the Smart Receipt service, the customer makes a purchase with a Smart Receipt-enabled credit card or a Smart Receipt card for cash/check purchases (step **801**). The when the card is swiped by the merchant, the POS system reads the user profile from the card or retrieves the profile based on a code stored on the card (step **802**). As an alternative to reading the profile off a card, the POS

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system may provide a menu for the customer to provide the necessary information. The Smart Receipt system will route the smart receipt to the proper destination, after determining the method of payment and user profile (step 5 **803**). If the customer uses cash or check, the smart receipt is sent to the Cash Receipt Services server (step **804**). Optionally, the receipt information may also be sent to a manufacturer server, as explained above. If the customer uses a credit card, the smart receipt is 10 sent to the credit card company (and/or manufacturer) (step **805**). Steps **803**, **804**, and **805** assume that the Smart Receipt service is using the architecture depicted in **Figure 5**. If the **Figure 6** architecture is used, all receipt information would be sent directly to a clearing 15 house server.

Referring now to **Figure 9**, a flowchart illustrating the Smart Receipt search process is depicted in accordance with the present invention. At a later time, the customer may need to retrieve a smart receipt (step 20 **901**). For example, the customer may need the receipt for warranty purposes or tax deductions. The customer enters search criteria such as item type, brand, alternative or substitute items, approximate date of purchase, and method of payment (step **902**). In addition to search 25 criteria, the customer can also indicate whether additional information about the item is desired. Examples of additional information include warranty, identical items available for exchange, alternative items available for exchange, customer alerts on product 30 safety, and product updates.

The Smart Receipt object uses the search criteria to locate the desired receipt (and any additional product

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information) (step **903**). The search criteria will also allow the Smart Receipt object to determine from which location to retrieve the receipt (i.e. cash server or credit card company). Of course, if a clearing house is  
5 used, receipts can be retrieved directly from the clearing house. The Smart Receipt object then downloads the information to the desired client machine, based on preferences in the customer profile (step **904**). Examples of client machines to which smart receipts may be  
10 downloaded include PCs, laptop computers, PDAs, mobile phones, and palm computers.

The customer can request multiple receipts, based upon search criteria or the category code provided at purchase. For example, for tax purposes, customers may  
15 need receipts for all purchases related to business. The customer specifies "tax deduction" in the search criteria or customer profile. The Smart Receipt object will then search for the "tax year" desired, and can download the necessary information to a PFM such as Quicken or Money,  
20 or to a tax application like TurboTax.

The Smart Receipt object can be used for a variety of functions in addition to retrieving smart receipts from previous purchases. As stated above, the Smart Receipt object can be preset to automatically request  
25 that receipts be sent to a clearing house account, to help ensure privacy. As another example, the Smart Receipt object may also be set to automatically register for warranties using information from the customer profile, thereby saving the customer from having to  
30 register every time a purchase is made. As stated above,

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certain receipts may be marked for later tax deductions. This preference may be preset in the Smart Receipt object for specified categories of purchases.

Customers may use the Smart Receipt object to  
5 automate their bills. This application may be particularly useful for small businesses which need to maintain extensive records for tax reasons and cost comparisons, but cannot afford expensive accounting services. For example, separate Smart Receipt accounts  
10 may be maintained for all employees in the company. The employees may use their accounts to access and organize receipts for expense reports. In turn, company managers may also use these accounts to compare and evaluate the expenses of employees, or for the firm in general.

15 The Smart Receipt object may also be used for more personal applications. Individuals may use the Smart Receipt object to gather receipts for personal tax deductions, or to compare similar purchases made from different merchants. As another example, after  
20 completing a purchase, but before leaving the store, the customer may retrieve a receipt using his or her PDA and compare the items on the receipt with items on a shopping list. In this way, the customer could perform a last minute check to make sure nothing was forgotten from the  
25 list.

To prevent receipt databases from becoming too cluttered, customers can delete unnecessary receipts using the Smart Receipt object. The customer may request the Smart Receipt object to delete specified receipts or  
30 set the Smart Receipt object to automatically delete receipts, based on criteria in the customer profile. For

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example, the Smart Receipt object might delete a receipt after the warranty for that item has expired.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.